We thank Johannes Freitag for its constructive review, and for his suggestions to improve the clarity of the paper and the dataset.
We have copied his comments below in blue, with our responses in black.

Best Regards,
Kévin Fourteau on behalf of all coauthors.

Fourteau et al present historical porosity data of firn from three polar sites originally measured by J.-M. Barnola with the means of gas pycnometry several years ago. These data were the base of the important closed porosity-density parametrization widely used in firn gas models. Fourteau et al. provide the raw data and give insight into the original data processing. They confirm the use of the dataset for the closed-porosity parametrization first introduced in Goujon et al. (2003) and highlight its limitation. I appreciate the reworking of this fundamental data set.

The manuscript is well written with an appropriate introduction and description of the method. The data processing is described in required detail to enable the reader to follow the analysis. The data set is accessible via the given identifier and complete. I highly recommend the manuscript for publication. In my opinion the data set will encourage further methodological improvements and investigations on the cut-bubble-effect. Maybe it would be worthwhile to set up a future study where different methods like X-ray tomography and pycnometry are applied on the same set of samples?
We strongly agree that a joint study of pycnometry and large-scale tomography is currently one of the best option to study the cut-bubble effect in firn samples, and to check the consistency between pycnometry and tomography-based data.

Specific comments: 1) The names of the columns in the data set are a little bit misleading. The pore volumes are named by "Poros_xx“ like “Poros_closed_cm__3_” which might be interpreted as abbreviation for porosity (no units) instead of pore volumes (unit in cm_3). I would suggest names like “Pore_vol_xx”. 2) The column “Pores_frac” should be renamed to “ClosedPorosRatio” as it is defined in the manuscript. 3) In the data sets there are some non-physical values like negative pore volumina or closed pore ratios larger than 1. I would prefer to assign them to the physical limits (0 or 1).
Unfortunately, it is ESSD policy to have the data registered before the submission of the paper and PANGAEA policy not to modify datasets once they are registered. We will therefore not be able to modify the data submitted to the PANGAEA database. We will add a sentence in the article highlighting the difference in naming between the database and the article **P9L10**:
“Finally, we made these data publicly available on the PANGAEA database (Fourteau et al., 2019a). Note that the naming convention used in the database is different from the one used in the article.”

We however do not agree that the data should be clipped to only have closed porosity ratios between 0 and 1. This would artificially reduce the experimental dispersion of the pycnometry method and introduce a bias in the data for fully open samples (respectively fully closed), as positive errors would no longer be statistically compensated by negative errors (respectively negative errors compensated by positive errors). We will add a sentence clarifying the presence of non-physical values in the dataset **P7L3**:
“Finally, because of experimental dispersion, some firn samples were measured with a closed pore volume below zero or above the total porous volume. Potential users of the data should be aware that these values are not physically sound, and reflects the experimental errors of the pycnometry method.”